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ABSTRACT

In a controlled experiment, the IIEP attempted to develop efficient teaching materials in the field of educational planning. Informal instructional materials were compiled from the tape recordings, transcriptions, and summary notes of seminars, lectures, and discussions conducted by the IIEP in its training and research programs. This instructional unit (1) examines the major learning theories and their application to innovation research; and (2) discusses some problems in innovation process management, decisionmaking, planning, and implementing change in educational innovations. Related documents are EA 003 931-938 and EA 003 942. (RA)

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The Fundamentals of Educational Planning : Lecture - Discussion Series

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No. 50 SOCIAL AND PSYCHOLOGICAL FACTORS IN INNOVATION AND EDUCATIONAL PLANNING

by T.A. Razik

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by

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I. Objectives

The immediate objectives of this paper are directed at the following specific themes:

(a) the major learning theories and their application to innovation;

(b) educational organizations and innovations - with emphasis on the need for flexibility in execution of strategies and activities;

(c) the differences in innovation, processes and strategies that exist in dealing with innovation directed towards changing objectives and means;

(d) the management of the innovation process, decision-making, planning and the implementation of change in the educational organization;

(e) the answer to such questions as: why change? what change? who plans for change and how? how does one implement such changes? with what results?

(f) definition, collection and preparation of decisions of long-range planning based on relevant data. For example:

(i) functions of the present educational systems relation to their objectives;

(ii) existing social needs;

(iii) alternatives for future educational objectives and systems;

(iv) existing information and possible future developments in instructional techniques, organizations, etc., including possible changes in teacher roles;

(g) continuation and support of innovations:

(i) the role of staff supporting the teachers;

(ii) creation of favourable attitudes towards innovation;

(iii) diagnosis and causes for failure in attempted innovations;

(iv) review mechanism and 'controlling reform';

(h) strategies involved in dissemination of innovation in education:

(i) written material;

(ii) new instructional media;

(iii) teacher-training, in-service training;

(iv) information dissemination to educational personnel.

II. Definition of innovation

Innovation is a process of attempting some changes in an educational system. These changes are consciously and purposefully geared for improvement of the existing system and do not necessarily entail the introduction of new variables.

From the above definition it can be seen that innovation is a social phenomenon; the real meaning of the term is difficult to determine or analyse. Sometimes innovation should be considered as a goal in itself.

Is there a need for innovation? The answer would seem to be in the affirmative because it is one of the best methods of reaction in a changing society.

In certain circumstances, the concept of innovation may be valuable as a goal in itself. For example, in a change-oriented society people feel that they are effective and leading significant lives when they are the instruments of change. In an educational system with a high rate of innovation, regardless of its actual effectiveness in the environment of learning, those who plan the work and make the decisions probably feel that their role is of importance. In education if implementation takes place arising from the initiative of teachers, students and administrators, these persons will then know that they are making a worthy contribution.

However the need for a systematic change in the educational field should be stressed as a change of objective of such a field, but this is difficult to ascertain as education and society are interlinked. Human societies, just because they are societies of human beings, are always subject to change. These changes are the natural consequences of the continuous challenge between the ideal man and the reality in which he lives. The challenges which we, as human beings, experience in our society, are changing continuously. Our opinions and ideals therefore change simultaneously thus creating a more dynamic society. The changes in technical societies are so radical and draw attention to the wide gap existing between ideals and opinions regarding the achievement goal of education and what is achieved in practice. Only a systematically and scientifically well-thought-out approach to the problem of large-scale educational change can provide those educational changes that truly respond to a changing society. In reviewing the history of education and innovation there are found to be three phases of influence:

(1) the individual activities of the innovator;

(2) co-operation of those with synonymous ideas on innovation;

(3) the development of post-war movement for innovation in education as an art and science of teaching, which are a social necessity evolving into a systematic approach to educational change.

There is an imperative need for more insight into the process of innovation for improvement of its management.

If applied and basic scientific research are to contribute to the management of innovation, based not only on general experience but on data provided by empirical research, then the separate research projects in the innovation process should be so organized that they contribute to the further development of educational innovation theory.

The function of such theory and its development is to improve our understanding of the problems of systematic change. Due to the improvement in the management of innovation, the resultant nature and extent of the needed changes in the various educational systems should no longer be left to casual initiatives of separate groups and individuals. A theory of educational change should, therefore, combine the knowledge of the methodology by which the results of tested innovative activities can be disseminated in the wider circle of an educational system. This requires not only an insight into the process of changes, but also research into the methods of transmission and their translation into educational realm.

No doubt there is universal agreement over the need for changes and improvements in the educational systems of most countries. There are few built-in mechanisms in which education and society are interrelated. Embarking on innovation, therefore, one builds upon very vague assumptions on the need for change. As yet, there are no organizations to carry out a critical evaluation function for elementary and secondary schools or higher education. As a result of this, there are seldom any bases upon which to establish change.

This lack of contact with outside organizations to provide bases for change applies also to school relationships as well as other segments of society, such as the home, the government, industry, business, and other institutions. The needs of the environments for change in learning attitudes and proficiencies are often very vaguely expressed making it very difficult to use them as a basis for continuous revision and modification of the curriculum. Research and information channels should, therefore, be established between the different groups involved, so that the most urgent needs for change will influence the planning and creation of innovation.

III. Direction for innovation

There are many divergencies in the organization of educational systems in different countries which makes it difficult to find one single theory for structuring the innovation process to fit all educational systems. For example, a society with a centralized educational system is radically different from a decentralized one.

(i) Entry points for innovation in the educational system

There might still be some traditional and conservative systems that resist almost any type of innovation, presenting special problems for the innovators. In the international context two strategies must help to open up these closed systems:

(a) the use of an international organization such as Unesco, IIEP, OECD, IBRD, as a sponsoring agency which should be responsible for analysing possible policies and strategies;

(b) such an international organization could invite a country to sponsor educational innovative experiments which might be acceptable for international prestige reasons, but once adopted, it could become a stepping stone for new ideas;

(c) in some systems, e.g. a university student in rebellion against ... the system achieved rapid changes in the universities.

In general, there should be order or stages for development of an innovative system. Thus, early conservative systems might lend to the establishment of experimental schools; these should be carefully controlled, and, at least in the view of the authority, conforming with the rest of the system.

Another point of entry into a conservative system might be the importation of a change agent such as a consultant or an innovative specialist. This would be particularly useful for a small system or single school district. The idea has been tried out in industry and a well known senior member of the personnel assigned to this duty was found to be the most successful. It is also important that this assignment neither carries nor is subject to authority. The occupant must depend on persuasion rather than giving orders. He then assists the constituted authorities of the school in making changes, giving advice, teaching them the processes when they need it.

A second approach would be to search for weaknesses in the system and innovate at these points. Any educational system is bound to suffer from some weaknesses, the realization of which implies a readiness for change and, therefore, constitutes an appropriate place for the introduction of innovation.

On the national level, innovations in the educational field should be developed through centres or national boards. The role of such a centre would be to stimulate educational innovations by:

(a) acting as a national clearing house for all innovations, plans and projects undertaken anywhere in that country or other countries;

(b) by giving the Minister of Education advice in regard to allowing experiments to be made, and, also, by proposing new directions;

(c) by planning study and research assignments.

(ii) Characteristics of innovative systems

It seems to be relevant here to mention some points in relation to innovation. It is by no means a complete list but shows some of the characteristics of innovative systems.

(1) Any innovative educational system should include two-way communication between the planner and the manager. In other words, there should be the shortest possible social distance between them.

(2) All relevant groups should be geared into the innovation. Relevant groups of those who would be affected by the innovation. Geared-in, meaning that they should have a chance to plan and control the process of the innovation. Such groups would include the administrators, staff, specialists, teachers, students and often parents and other interested groups in the community.

(3) There should be provision for information in-put into the school system from a variety of sources, from research and development units, from teachers' associations, from the student groups, from publications, through attendances at conferences, through service on committees, etc

(4) Conflicts appearing within the school should be used as an indication that change or innovation is needed. Thus conflicts would be welcomed and should not be denied, covered over, nor should they be resolved by regulation.

(5) Rewards should be provided for innovators. Teachers, students, or administrators who contribute new ideas accepted and utilized by the authorities, should be duly recognized for this and given facilities for carrying it out.

(6) Provision should be made for the continuous re-examination of goals at specific intervals. In some cases this could be a continuous or rolling reform, perhaps in the area of curriculum. Other areas of the school such as the authority pattern, the promotion pattern, the relationship between the teacher and the students, etc., should be reviewed and questioned at regular intervals.

(7) There should be flexibility of roles within the system; the mark of the rigid bureaucracy is that people are trapped within rigidly defined roles, carefully prescribed duties, relationships and privileges. The mark of the innovative system was held to be one in which people played multiple but flexible roles. Flexibility was thought to be achieved by giving the rank to the person rather than to the position, so that the person who moved around the system would be neither low privileged nor salaried. He might move from teaching to administration to research and back but would always carry with him the improvements he had made. It was also felt that the role system should make provision for removing administrators too long in office.

(8) The system should be self-renewing. This is really implied in the idea of continuous re-examination and in the flexibility of the system itself.

(9) The system should contain experimental and free schools and programmes as well as research and development units.

(iii) A proposed model approach for the process of innovation in education

It should be noted that a theory of the innovation process in education does not exist. Some general steps or principles could be identified. From a more practical point of view it is of value to propose a working model to serve as a check-list for innovators built on a theory-underlying process. The proposed model presented here is probably inspired by a more systematic and logical point of view. This proposed model takes for granted that it is possible to identify steps and plan the process.

If the innovation is tested as a purely creative one, through its various steps, it will probably be difficult to accept the systematic and logical approach since the latter does not necessarily include the creative element. However, the planned process should have as a major objective possibilities for creation throughout innovation.

The proposed model (see Figure 1), is based on a time dimension from planning to dissemination. Through the whole process there are other context factors which may play a part at each stage.

Planning includes such aspects as governing of relevant data, creation and initiation. In some countries, before the planning can begin a political decision will have to be made.

The construction includes design and selection of material and development of all relevant ideas. The experimental setting may be an informal or formal research pilot study as an initial trial.

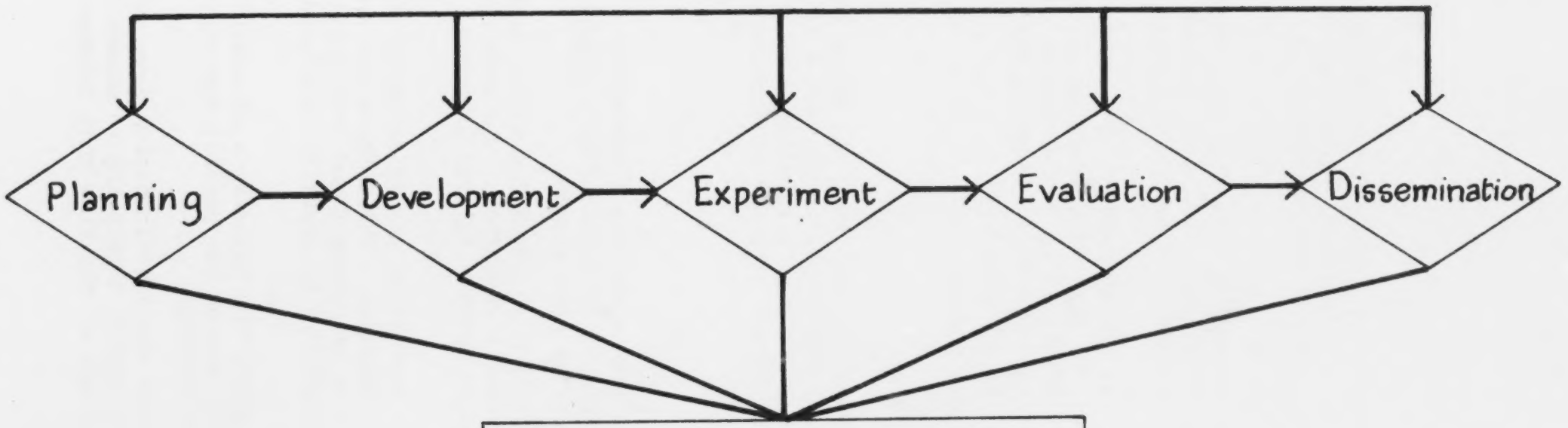

Figure 1. The process of innovation in educational plannings

The evaluation requires a systematic design with the basis for the necessary revision that will influence subsequent planning, construction, experiment, and evaluation. The dissemination phase is the last step, if the innovation is to be successfully developed.

Also in Figure 1 the context factors are dimensions that will influence the whole process. Teachers, planners and research workers should be trained and teaching/training programmes should reflect resultant improvement and changes.

The management of the process can be seen as the management of inter-action between the context factors and the five steps of the process. Learning psychologists suggest that learning proceeds by selective reinforcements of behaviours or dispositions seldom present in the learner. The following three major learning theories contribute to the process of planning of innovation in education.

- the Stimulus-Response Theory (S-R)
- the Cognitive Theory
- the Personality Theory

It is possible to propose a number of principles that have all along been prominent in S-R theory, a second set suggested by cognitive theory, and a third set coming from the study of personality. These principles are believed to be in large part acceptable to all parties and the affiliation with one or another source is a matter of emphasis rather than of controversy.

A. Principles emphasized within S-R theory

(i) The learner should be active, rather than a passive listener or viewer. The S-R theory emphasizes the significance of the learner's responses, and 'learning by doing' is still an acceptable slogan.

(ii) Frequency of repetition is still important in acquiring skill, and in bringing enough over-learning to guarantee retention. One does not learn to type, or play the piano, or to speak a foreign language, without some repetitive practice.

(iii) Reinforcement is important; that is, repetition should be under arrangements in which correct responses are rewarded. While there are some lingering questions over details, it is generally found that positive reinforcements (rewards) are to be preferred to negative reinforcements (punishments).

(iv) Generalization and discrimination suggest the importance of practice in varied contexts, so that learning will become (or remain) appropriate to a wider (or more restricted) range of stimuli.

(v) Conflicts attendant upon generalization and discrimination have consequences that may be unintended by the person attempting to manage the learning. Many of these consequences are of the kind that interest students of psychopathology.

(vi) Drive conditions are important in learning, but all personal-social motives do not conform to the drive interpretations of Hull and Spence. Anxiety appears to act as a drive should, but achievement motivation apparently does not.

B. Principles emphasized within cognitive theory

(i) A learning problem should be so structured and presented that the essential relationships are open to the inspection of the learner. Thus perceptual aspects of the problem (figure-ground relations, directional signs, 'what-leads-to-what') represent important features.

(ii) The direction from simple to complex is not from arbitrary, meaningless parts to meaningful wholes, but instead from simplified wholes to more complex wholes. This suggests that we need to study the psychological organization of knowledge, and should not deal mechanically with the part-whole problem.

(iii) Learning with understanding is more permanent and more transferable than rote learning or learning by formula. This generalization gives point to the similar emphasis within S-R theory on meaningfulness as a factor making for ease of acquisition and recall.

(iv) Cognitive feedback establishes probabilities and (in some cases at least) is an appropriate explanation of effective reinforcement. The corresponding S-R principle is that of knowledge of results. The notion is that the learner tries something provisionally, and confirms his attempt by its consequences.

(v) Goal-setting by the learner is important as motivation for learning, and his successes and failures are determiners of how he sets his future goals. The attempt to reduce cognitive dissonance leads to many kinds of maneuvers after the results are in.

It will be noted that this list from the cognitive position is somewhat harder to specify than that from S-R theory, and the points, while plausible, lack systematic proof. It should be noticed that this lack of working out of cognitive learning theory does not mean that the theory has nothing to offer.

C. Principles from personality theory

Whenever one considers the arts of practice it is not possible to preserve the neat compartments of knowledge permitted the investigator in the laboratory. Some of the following principles, little emphasized within the psychology of learning, are important background factors for school learning.

(i) The learner's abilities are important, and provisions have to be made for the slower and more rapid learners.

(ii) Some abilities are a matter of physiological and social development and knowledge of development should be related to the demands made on the learner. Some such knowledge may turn out to be very important, e.g., in the teaching of reading and spelling.

(iii) Personality is a social product. Hence it is important to be aware of the culture and sub-culture as they are relevant to what and how the learner can learn.

(iv) Anxiety level, especially the 'test anxiety' of Mandler and Sarason appears important in determining the beneficial (or detrimental) influence of praise and blame. The generalization appears justified that with some kinds of tasks high-anxious learners perform better if not reminded as to how well (or poorly) they are doing, while low-anxious learners do better if they are interrupted with comments on their progress.

(v) The same objective situation may tap appropriate motives of one learner and not of another. The contrast, for example, between those high in achievement motivation and those high in affiliation motivation has been reported to be of great importance.

(vi) The organization of motives and values in the individual is relevant. Some long-range goals affect short-range activities. For example, college students of equal ability may do better in courses perceived as relative to their majors than in those perceived as irrelevant.

(vii) The group atmosphere of learning (competition vs. co-operation, authoritarianism vs. democracy, individual isolation vs. group identification) will affect satisfaction in learning as well as the products of learning.

From the above points and with general considerations in the background, some proposals for a rapprochement between the psychology of learning and educational practices should be made.

(a) A taxonomy of learning as it applies to the classroom would prove useful in any planning for innovation in education. If the task were better known it would be easier to know how to achieve it. For example, consideration should be given to questions such as these: What kinds of teaching can best be done through technological innovations? What is the most effective contribution of the classroom teacher? Of the specialist? What unique services have the library, the laboratory, the studio, the shop, the field trip? How do we teach curiosity, research, initiative, inventiveness? A start has been made in the area of taxonomy of educational objectives. A taxonomy of processes to be interwoven with such a list is needed.

(b) Beyond research on principles of learning it is of great importance to bridge the gap between theory and practice (that is, on what has come to be known as developmental research) and to research at the point of application (what is referred to as operational and evalua tive). In some sense there is a need for a revival, with a sounder research base, of what is called the psychology of special school subjects and the psychology of innovation and educational planning.

(c) Educational research is a problem in applied social psychology as well as a problem in the psychology of learning and innovation and innovation and educational planning. Before implementing scientifically based educational changes, their outline and proposals should first be approved by the prospective consumers. Among the consumers of these changes are not only the learner, but the teachers, administrative officers, ministries of education and parents. Hence effective educational research for innovation and planning requires a strategy of participation and decision-making so that proven results will become a part of practice. This is a more difficult point than it appears at first, but it must be considered early in the design of any kind of experimentation in planning for innovation, that islikely to lead to changes in facilities or practices. The two main points to be seen here are (i) to involve the teacher in such research as a responsible member of a research team, and (ii) to involve representatives of the planning offices and community early enough so that they are committed to make the changes dictated by the results of such research.

In these terms, the educational system might be reviewed as a learning organism for certain purposes.

Returning to the model in Figure 1, the 5-phases from planning to dissemination blend themselves to this point. The sequence of learning stages proposed by the S-R Theory, particularly by Skinner, suggest the following: The first phase in which the immediate learning task is defined, is by identification of the behavioral objectives. The second phase is the determination of the enabling objectives for achievement of these tasks, i.e. what is the learner able to perform? The third phase is the actual performance by the learner. The fourth phase is the evaluation of the performance sent back to the learner (feedback). The fifth and final phase is where the learning process is completed and becomes part of the learner experience.

Looking back to the proposed model, Figure 1, the following are covered:

(1) Initiation and designing of the plan;
(2) construction and development of the plan (design and production);
(3) trial and experiment;
(4) evaluation and revision;
(5) dissemination and diffusion.

Even granted that this proposed model is a promised one, how far can it be carried out? What hypotheses does it suggest? Analyses can open up at least one or two further lines of enquiry.

The first and most obvious implication to be drawn, is that the innovator, like the teacher, needs to have a clear idea of what he is trying to accomplish. If his aims are obscure, the whole exercise is likely to be inadequate. Secondly, innovation, like learning, must begin at a point where desired tendencies have already begun to manifest themselves. Just as, for example, a child cannot learn to count before he is capable at least of distinguishing one from another the different numerical characterizations, so an educational system cannot adapt itself to, say, a new method of teaching science, unless there is at least some current dissatisfaction with the old teaching methodology to the concept of modification or change. Innovation takes root by encouragement and reinforcement of what is already inherent in the educational system.

Some further implications suggested by this parallel between innovation and the learning theory mentioned above especially concern variables such as active involvement, motivation, generalization, discrimination, perception, learner's ability, frequency, goal-setting, feedback, and the need to cater for individual differences. For innovation to succeed, it must directly involve the educational system to be modified or changed; merely to set up a demonstration model and to hope it will be generally imitated is to court much of the same disappointment as a teacher who merely portrays a technique without giving his students the opportunity of practical learning. Practical engagement in the process of innovation is quite a different matter from the theoretical acceptance of it. Even this theoretical acceptance cannot be taken for granted - the need for simulation and motivation is equally important. An educational system cannot reasonably be expected to undertake changes simply for the sake of change; there must be some intrinsic or extrinsic value manifested at the outset of the motivation process. Furthermore, educational systems are no more to be identified one with another than are learners; an innovational strategy that succeeds with one system may not be applicable to another on account of the relevant basic differences within each system.

Before discussion of the management aspect of the innovation process, a profound analysis of the model is required. Figure 2 shows the proposed model in further detail taking the above developments into account.

Figure 2 shows the model constructed in three dimensions. Dimension A suggests major sub-categories or operants within the operating educational system which might, in one fashion or another, be altered to improve the efficiency, effectiveness or relevance of current practice. Another important point here is that these sub-categories - instructional systems, teachers, meaning professional roles, management structure - at the individual school or institution level, finance and administration and political framework - are, of course, in the same domain and related more or less closely to one another, and should not be seen as separate variables as might otherwise be implied in the model.

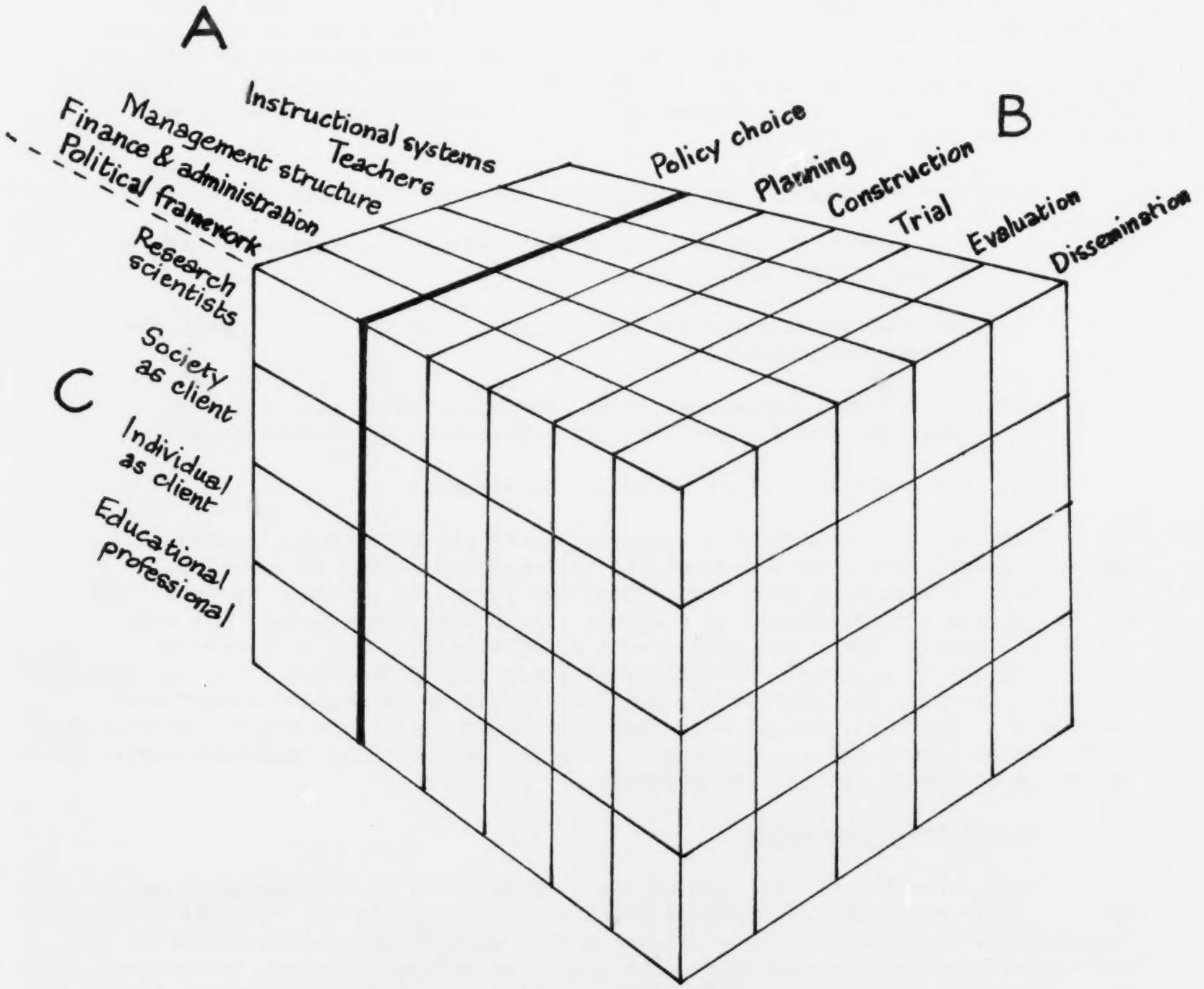

Figure 2. A model for management of innovation in education

Source: This model is adopted from A management model for innovation in education, OECD

Dimension B suggests a way of viewing sub-categories in the diagram of the change process. It should be noted that the policy choice of sub-goal is one of the most important variables. It is the strategy which provided the frame for the discussion and also an attempt to formulate the questions surrounding the basis for decision-making, which precedes commencement of work on an innovation.

Dimension C presents some suggested sub-categories which identify:

(1) the sources of information or data relevant to management at all stages of the innovation process;

(2) the kind of manpower required to carry out the functions of the innovation process;

(3) the source of knowledge of all those variables that might be important for the practice and improvement of education; and

(4) the activities of research and development.

Society is seen here as a supra-system of the educational system, e.g., manpower needs, and is thus necessarily an important source of input data. It should also be mentioned that individuals are variables of these systems. They may be important participants as subjects in research, development and field-tested activities. Both variable groups provide major forms of reference to developing future alternatives which will guide policy choice for the innovation process. Finally, the personnel administering and operating the educational systems are important variables of information and data about present professional needs, requirements and capabilities. They are also vitally important participants in the development, testing and evaluation.

IV. Operation of the model

Each cube of the model can be examined in terms of the degree to which, social, individual, professional or scientific data inputs are relevant to policy formulation, decision-making, or actual performance of the separate step in the innovative process. For example, with regard to policy choice on the content of an instructional system, it would be possible to say that at general levels of sub-goals, analysis relative to alternative presents and futures, individual and social groups would show much higher degrees of appropriate involvement than research scientists or professionals. In the design construction the trial of proposed systems achieve identified objectives and research scientists play a predominant role along with educational professionals, but groups play relatively small parts. This example, however, is illustrative only, not definitive. Before such conceptions become accurate and, therefore, useful guides, careful thought needs to be directed to:

(i) the requirements of analysis in each instance; and

(ii) the particular capabilities of offering information from several sources of the data input before firm fixtures or appropriate involvement emerge. Further examination of the model suggests that the level of participation indicated for each research scientist, individual and professionals in each cube depend upon a variety of highly situational variables, including the specific proposal or need, the nation or state, the state of the art with reference to the proposal, etc., refer back to innovation suggestion.

The model appears to be neutral in respect to a number of issues which should be continuously evaluated. It suggests a framework for deliberation, however, and a check-list which may enable us to anticipate problems. Development of the capabilities is important in anticipating potential trouble spots which: (i) might otherwise have led us to reject the effort in the first place, or (ii) compromise its success.

V. The management of the process

The major variables of the management of the innovation processes are as follows:

(i) Policy decision

Before the planning of specific innovations begins, policy decision has generally been established, at a high level, usually by the Ministry of Education In fact, it is probably highly desirable that an official mandate for change precedes any action. The aim of all countries should be to establish something like the strategy of innovation which exists in Sweden and which is described as (a) clear political decision on the goals of the educational system and the objectives to be achieved in each type of school; (b) the refinement of those general goals and objectives into a working curriculum and study plan for each type of school;(c) a programme of in-service training for teachers to assist in the introduction of new curricula and teaching methods; (d) a programme for research and development to support the policies of reform and innovation; (e) a system of continual revision by which the curriculum and study plan for each type of school is assessed in terms of its own objectives.

(ii) Planning

Further it is necessary to establish clear principles for the kind of planning that should precede and influence the policy decisions. There are two possibilities to be described in detail here. One concerns the nature of planning itself and some of the variables involved - this is an extension of the discussion of Figure 2, Dimension A. The other concerns the method of co-ordinating planning procedures through an independent planning body.

The nature of planning itself. There are three steps in long-term planning: (1) alternative future must be specified; (2) adequate information must be collected on the functioning of the society; (3) development of techniques or change.

In order to examine a working model of this process, one should postulate a future in which educational systems and its peers within the framework of the super system will have two main aims - to maximize individual potentialities, and to develop competence to justify the individual's position.

In considering methodologies for change, five variables may be considered:

(1) political framework;
(2) finance and administration;
(3) institutional management structure;
(4) instructional systems;
(5) teachers.

In each area, the source of innovation should be determined, and so should mechanism for securing the adaptation of these innovations. Consideration should be given to each area in turn, and the planner should propose its objectives, bearing in mind the two main aims set out in the preceding paragraph. This will necessarily be somewhat sketchy in its development, but will establish a framework within which to implement such innovation.

(1) Political framework

(i) Establish community advisory and evaluative system.

(ii) Improve two-way communications flow between educational system and society at local, regional and national level.

(iii) Improve and rationalize the decision-making network.

(iv) Establish over-all and national planning systems to allow national and international co-ordination of effort and resources.

(2) Finance and administration

(i) Ensure professional staffing competence management at all levels.

(ii) Devise rationale and wherever necessary, give differential resources, location, procedures between different institutions and different age sectors.

(iii) Allocate adequate research and development funds to design, evaluate and implement innovations in systems, teacher training and management.

(iv) Design over-all management structure to operate two-way communication flows and maximal delegation at every level.

(v) Analyse the effectiveness of the over-all structure itself and improve it by feedback.

(3) Institutional management structure

(i) Evaluate the performance of institutions and sub-departments in terms of productivity - value added between inputs and outputs.

(ii) Improve information systems and feedback under No. 1.

(iii) Incorporate the following as participants in decision-making of over-all goals and instructional patterns adopted; teachers, students, parents, employers, communities.

(4) Instructional systems

(i) Design the systems to reflect the shift of emphasis from teaching to learning, and from competition to co-operation. (See Figure 3).

(ii) Relate over-all costs clearly to general education, social and economic requirements.

(iii) Optimize the use of human and physical resources within the outside institution itself.

(iv) Provide the widest feasible choice of learning units, and alternative routes through the system.

(v) Specify objectives and minimum performance levels for each learning unit.

(vi) Provide individual choice of routes and back-up guiding system.

(vii) Aim to achieve success by at least 90 per cent of performers within each learning unit with time as variable.

(viii) Achieve the desired balance between individual and co-operative activities.

(5) The teacher

(i) Ensure that the teacher/training institution exerts an innovative influence on in-service and pre-service training.

(ii) Reflect the desired models of teaching/learning process, teaching moving to learning, school moving from closed to open, in the training techniques themselves.

(iii) Train teachers to implement desired models.

(iv) Train all teachers to become aware of innovative models and to be open to, evaluate and decide on innovations.

(v) Analyse and provide training for different roles, e.g.:

- learning system analyst;
- learning system designer;
- evaluator/tester;
- guidance/counsellor;
- diagnostician/manager of learning;
- presenter/tutor/administrator/manager of institution or sub-department;
- various supportive roles.

(vi) Encourage and reward teachers who successfully innovate or implement.

(vii) Analyse and re-shape teacher values in relation to Nos. 4 and 5.

In conclusion, the second possibility - the kind of planning necessary for innovation - will depend largely on the state of the development within the country. But the question of perspectives is of universal importance as thereby planning is set within a framework of short-term and long-term objectives and clearly relates all the elements, whether short or long-range, to each other. Planning is, therefore, seen in the context where the best possible information is available during the pre-planning stage as well as make the educational planners aware of all pressures for change by contact with the relevant interested groups.

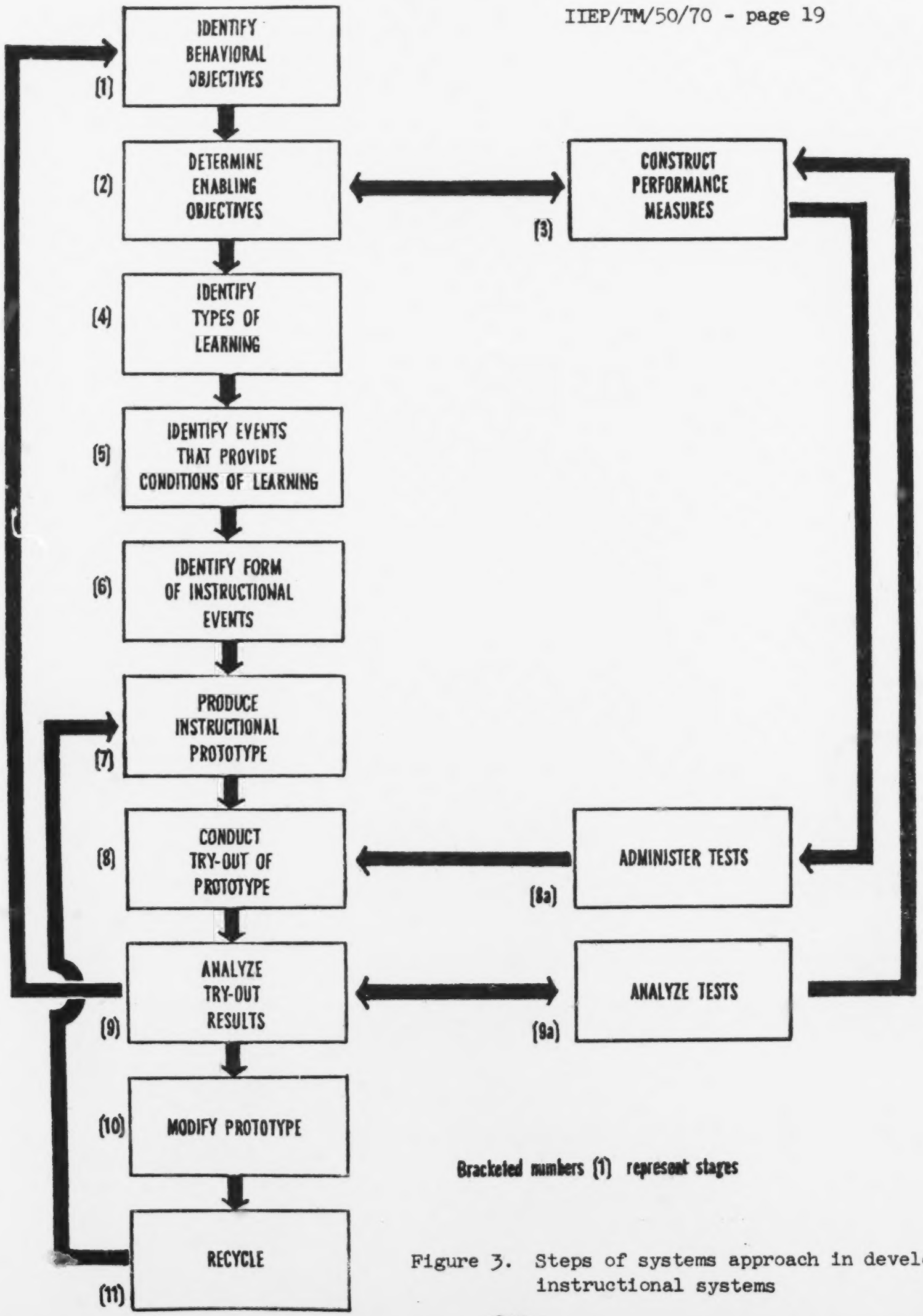

Figure 3. Steps of systems approach in developing instructional systems